

# **MyPower S2000 Series Backward Power Feeding Switch User Manual**

**MAIPU**



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Scheme: Research data services

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# Content

Chapter 1 Accessing Device .....	7
1.1 Accessing Mode .....	7
1.2 Web Configuration.....	7
1.3 Log in.....	7
Chapter 2 Management .....	9
2.1 Password Configuration .....	9
2.2 System Configuration .....	9
2.3 System Status .....	10
2.4 Restore to Default Configuration .....	11
2.5 Firmware Update.....	11
2.6 Reboot Device.....	12
Chapter 3 Port Configuration .....	14
3.1 Port Configuration .....	14
3.2 Port Mirror .....	15
3.3 Bandwidth Control .....	15
3.4 Broadcast Suppression .....	16
3.5 CpuCar and port enable configuration .....	16
<b>Chapter 4 VLAN Configuration .....</b>	<b>18</b>
4.1 VLAN Mode .....	18
4.2 VLAN Member.....	18
4.3 VLAN Fast Configuration .....	20
<b>Chapter 5 Packet Accounting .....</b>	<b>22</b>
5.1 Packet Accounting.....	22
<b>Chapter 6 Qos Configuration .....</b>	<b>23</b>
6.1 Priority Mode .....	23
6.2 Priority Configuration Based on TCP/UDP and IP TOS/DS...	24
6.3 802.1p and Physical Port Priority .....	25
<b>Chapter 7 Packet Security Filtering .....</b>	<b>26</b>
7.1 MAC Address Binding .....	26
7.2 TCP/UDP Filtration.....	26
<b>Chapter 8 Spanning Tree .....</b>	<b>28</b>
8.1 STP Bridge .....	28
8.2 STP Port.....	28
8.3 Loop Detection .....	29



<b>Chapter 9 Truck</b>	31
9.1    Truck Configuration	31
<b>Chapter 10 DHCP Relay Agent</b>	32
10.1    DHCP Relay Agent	32
10.2    Relay Server	32
10.3    VLAN MAP Relay Agent	32
<b>Chapter 11 Backup and Recovery Configuration</b>	34
11.1 Configure Backup and Recovery	34
<b>Chapter 12 Other Function</b>	35
12.1    Other functions	35
<b>Chapter 13 Overtime Exit and Re-log in</b>	36
13.1    Overtime Exit	36
13.2 <b>Re-log in</b>	36
<b>Chapter 14 Restore to Default Hardware Configuration</b>	37
14.1    Restore to Default Hardware Configuration	37
<b>Appendix 2 Terms</b>	38
<b>Appendix 2 Terms</b>	40
<b>Appendix 3 Cable</b>	41
RJ-45 Connector	41
Make Cable	42



## Preface

### Introduction

This manual introduces series backward power feeding switch in details. This manual can help users to understand our product and also guide users to install, configure, manage and maintain it.

### Audience

This manual is for the networking professional who has experience working with the concepts and terminology of the Ethernet and local area networking and is also familiar with the switch software features.

### Conventions

#### 1. General conventions



Convention	Description
Black	Headings are in black
Times New Roman	Normal paragraphs are in Times New Roman
Arial	Cautions and notes are in Ariel

#### 2. Command conventions

Convention	Description
<b>Boldface</b>	The keywords of command lines are in boldface.
<i>Italic</i>	Command arguments are in italic
[ ]	Items (keywords or arguments) in square brackets [ ] are optional
{X  Y ...}	Alternative items are grouped in braces and separated by vertical bars. One is selected.
[X  Y ...]	Optional alternative items are grouped in square brackets and separated by vertical bars. One or none is selected.
!	A line starting with ! sign is comments.



### 3. Symbols

Symbol	Caution	Description
	Note, comment, tip, knowhow, thought	A complementary description
	Caution, warning, danger	Reader must be extremely careful during the operation

### Technical assistance

The Maipu website provides online documents and tools for product and software updating, manual revising, and technical serving etc.

URL:[www.maipu.com](http://www.maipu.com)

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## Chapter 1 Accessing Device

### 1.1 Accessing Mode

Configure the device through WEB configuration page, including: switch management, port configuration, and VLAN configuration. Use your web browser (Internet Explorer5.0 or later is recommended) to configure the switch.

### 1.2 Web Configuration

Each network interface supports WEB management, default administrative IP is 192.168.2.1, mask is 255.255.255.0 and default gateway is 192.168.2.254. PC of the administrator should connect to the device for administration.

### 1.3 Log in

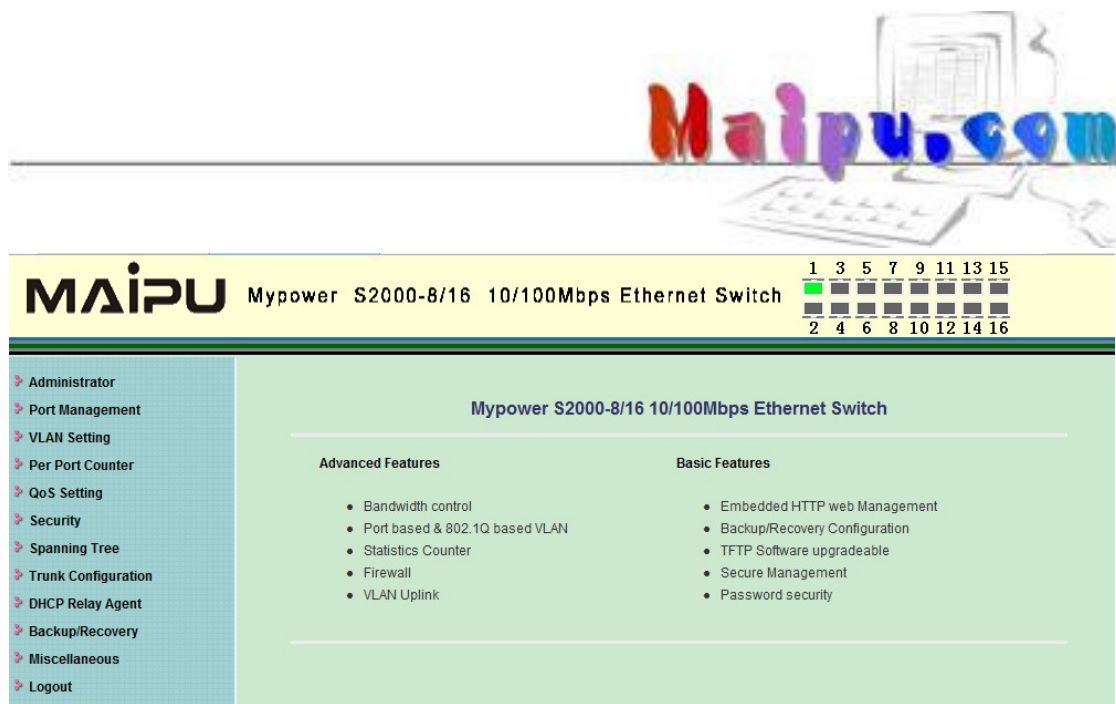
Type the IP address `http://192.168.2.1` in the location box (PC of the administrator should connect to the device for administration) and press enter:

Type username in (ID) and password in (Password) before click (OK). Then enter into configuration page .



Note: Default username is **admin** and password is **admin**, which can be modified in (Authentication Configuration).

The main page as below:



The left is index of each function options and right is the description of (Advanced Features) and (Basic Features).



## Chapter 2 Management

### 2.1 Password Configuration

Click (Authentication Configuration) under (Administrator) on the left

**Authentication Configuration**

Setting	Value
Username	<input type="text" value="admin"/> max:15 Characters
Password	<input type="password" value="*****"/> max:15 Characters
Confirm Password	<input type="password" value="*****"/>
<input type="button" value="Update"/>	

Modify current username and password on this page.

Click (Update) to affirm configuration. Successfully modification will show as following:

**Update  
Successfully!!**  
  
Please Click "Relogin" to use new setting to login

Click (Re-login) to login in again using new username and password.



Note: Username and password can only use numbers and letters.

### 2.2 System Configuration

Click (System IP Configuration) under (Administrator) on the left:

System IP Configuration	
Setting	Value
IP Address	192 168 2 1
Subnet Mask	255 255 255 0
Gateway	192 168 2 254
IP Configure	<input checked="" type="radio"/> Static <input type="radio"/> DHCP
<input type="button" value="Update"/>	

Modify (IP Address), (Subnet Mask), (Gateway) and (IP Configure) on this page. IP address cannot be all 0, all F and multicast address. Click (Update) to affirm configuration and it needs rebooting the device.

## 2.3 System Status

System status includes: (MAC Address), (Number of Ports), (Comment) and (System Version) as following:

System Status	
MAC Address	00:1f:ce:00:00:01
Number of Ports	16Tx
Comment	Switch
System Version	V3.1.0 2011-09-07
Set MAC Address	Password: <input type="password"/> <input type="button" value="Confirm"/>
<input type="checkbox"/> Idle Time Security	Idle Time: <input type="text" value="0"/> (1~30 Minutes) <input type="radio"/> Auto Logout (Default). <input type="radio"/> Back to the last display.
<input type="button" value="Update"/>	

Input device name in (Comment) and click(Update) to modify it. Successfully modification will show device name on the page.

Input password "setmac" in (Set MAC Address) and click(Confirm) to turn to following pages:



SET MAC	
<div>Read</div>	
MAC Address	<div>00 : 0a : 5a : 00 : 01 : 01 <div>Write</div></div>
PHY Address	<div>PHY_ID 00 MII_ID 00 REG_VAL ffff <div>Write</div></div>
IP1717 REG	<div>Addr 00 Val 0000 <div>Write</div></div>
EEPROM	<div>Addr 0000 Val 17 <div>Write</div></div>

Write MAC address in this place and read/write the configuration value of PHY, MAC, EEPROM.

## 2.4 Restore to Default Configuration

Restoring to default configuration means to restore to factory status, not including IP address, username, and password.

Click (Load Default Setting) under (Administrator) on the left to turn to following page.

Load Default Setting

recover switch default setting excluding the IP adress, User name and Password

Load

Click (load). Reboot the device after modification.

Update  
Successfully!!

Please Click "Reboot" to reboot the device!

Reboot

Click (Reboot) to reboot device.

## 2.5 Firmware Update

It supports following update methods:

1. through web browse

Click (Firmware Update) under (Administrator) on the left to turn to following page:

Firmware Update

Please input the password to continue the Firmware Update process.

Password   
 ReConfirm

Notice:  
 After clicking the "UPDATE" button, IF the firmware update webpage is not redirected correctly or is shown as "Webpage not found".  
 Please connect to <http://192.168.2.1>

Enter password and confirm (the password is the same as the login in password) and then click (Update) to enter flash to erase the page. Following page will appear after that.

Firmware Update by Web browser

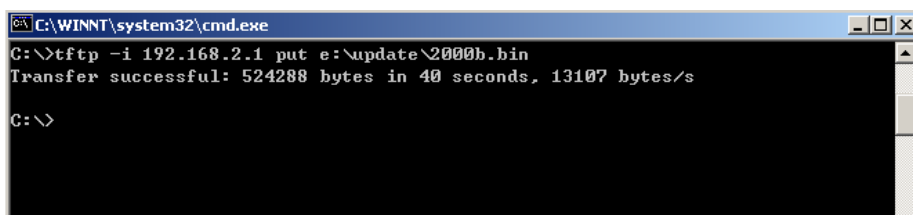
Select the image file:

Click "Update" to upload file:

Click (Browse) to select update file before click (Update) to update. It will last about 40 seconds. After successfully update, it will turn to login page

## 2. through TFTP

After flash erasure, run tftp client in Microsoft command line. Suppose device IP address is 192.168.2.1. Type : `c:\tftp -i 192.168.2.1 put filepath\filename.bin` and then press enter as following:



```

C:\WINNT\system32\cmd.exe
C:\>tftp -i 192.168.2.1 put e:\update\2000b.bin
Transfer successful: 524288 bytes in 40 seconds, 13107 bytes/s
C:\>
  
```

Re-log in the system after update.



**Caution:** Default update password is **admin**. If it shows error on the page or the update period is too long, please re-log in according to the prompt. Make sure the power is on.

## 2.6 Reboot Device

Click (Remote Device) under (Administrator) to turn to following page:



Reboot Device:

Click "Confirm" to Reboot the Device

Confirm

Click (Confirm) and reboot device.

## Chapter 3 Port Configuration

### 3.1 Port Configuration

On this page, port configuration include: Auto-N-Way, Speed, Duplex, 802.3x/backpressure, Tx Capability and Addr. Learning

**Port Configuration**

Function	Auto	Speed	Duplex	Pause	Backpressure	Addr. Learning
Select Port No.	<input type="checkbox"/> Port01	<input type="checkbox"/> Port02	<input type="checkbox"/> Port03			
	<input type="checkbox"/> Port04	<input type="checkbox"/> Port05	<input type="checkbox"/> Port06			
	<input type="checkbox"/> Port07	<input type="checkbox"/> Port08	<input type="checkbox"/> Port09			
	<input type="checkbox"/> Port10	<input type="checkbox"/> Port11	<input type="checkbox"/> Port12			
	<input type="checkbox"/> Port13	<input type="checkbox"/> Port14	<input type="checkbox"/> Port15			
	<input type="checkbox"/> Port16					
	<a href="#" style="border: 1px solid #00aaff; padding: 2px 5px;">Update</a>					

Select “configure port” in (Port Configuration) and choose corresponded ports, and then click(Update) .

(port status) and(port configuration) :

Port	Current Status				Setting Status					
	Link	Speed	Duplex	FlowCtrl	AutoNeg	Speed	Duplex	Pause	Backpressure	Addr Learning
1	<span style="color: green;">●</span>	100M	Full	On	Auto	100M	Full	On	On	On
2	---	---	---	---	Auto	100M	Full	On	On	On
3	---	---	---	---	Auto	100M	Full	On	On	On
4	---	---	---	---	Auto	100M	Full	On	On	On
5	---	---	---	---	Auto	100M	Full	On	On	On
6	---	---	---	---	Auto	100M	Full	On	On	On
7	---	---	---	---	Auto	100M	Full	On	On	On
8	---	---	---	---	Auto	100M	Full	On	On	On
9	---	---	---	---	Auto	100M	Full	On	On	On
10	---	---	---	---	Auto	100M	Full	On	On	On
11	---	---	---	---	Auto	100M	Full	On	On	On
12	---	---	---	---	Auto	100M	Full	On	On	On
13	---	---	---	---	Auto	100M	Full	On	On	On
14	---	---	---	---	Auto	100M	Full	On	On	On
15	---	---	---	---	Auto	100M	Full	On	On	On
16	---	---	---	---	Auto	100M	Full	On	On	On

(port status) means the true status of port link negotiation.

Through combination key shift+p can configure PoE Mode at ports, as below, options set to enable to the electrical port, disable as normal port. PD (Powered device) port means link up with POE power supply. Normal port means linkup with PoE power supply.

By default, port 1 as normal port from the beginning to end (no configuration) , other ports



are PD ports. Only port1 can supply power to hanging down PD (Output 10W power) .

## 3.2 Port Mirror

System provides port mirror, that is, copy the packets in specific or more ports to monitoring port for packet analysis and monitor. As following picture, select monitor port in (Dest Port) and monitored port in(Source Port) .(Monitored Packets) includes: disable, Rx, Tx and Rx&Tx. Choose needed configuration and click(Update)

Port Mirroring								
Dest Port	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>
	9 <input type="checkbox"/>	10 <input type="checkbox"/>	11 <input type="checkbox"/>	12 <input type="checkbox"/>	13 <input type="checkbox"/>	14 <input type="checkbox"/>	15 <input type="checkbox"/>	16 <input type="checkbox"/>
Monitored Packets	Disable ▾							
Source Port	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>
	9 <input type="checkbox"/>	10 <input type="checkbox"/>	11 <input type="checkbox"/>	12 <input type="checkbox"/>	13 <input type="checkbox"/>	14 <input type="checkbox"/>	15 <input type="checkbox"/>	16 <input type="checkbox"/>
<div>Update</div>								
Multi to Multi Sniffer function								



Caution: One-to-one port monitor is not supported.

## 3.3 Bandwidth Control

In this function, user can configure the max sending and receiving rate. The speed granularity is: Low 32Kbps and High 512Kbps.

Formula: Max sending and receiving rate

=Rate control (0~255) x 32 kbps (low bandwidth)

=Rate control (0~255) x 512 kbps(high bandwidth)

Click (update) to update configuration. Click (LoadDefault) to restore to default configuration. After that, the speed rate is connecting speed as following:

Bandwidth Control		
Port No	Tx Rate	Rx Rate
01	0~255 (0.full speed)	0~255 (0.full speed)
Speed Base	Low: 32Kbps High: 512Kbps all ports use the same speed base	
<div>Update</div> <div>LoadDefault</div>		
If the link speed of selected port is lower than the rate that you setting, this system will use the value of link speed as your setting rate.		



Note: If the connecting speed rate is smaller than the bandwidth control rate, the connecting speed rate will be bandwidth control rate.

### 3.4 Broadcast Suppression

As following, select port in (Enable Port) and input 0-63 in threshold which means the max broadcast number permitting in certain in the port. Port rate 10Mbps equals to 5000us time unit, and port rate 100Mbps equals to 500us time unit time.

Broadcast Storm Control								
Enable Port	1	2	3	4	5	6	7	8
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	9	10	11	12	13	14	15	16
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<div>Update</div>								
200pps for 10Mbps speed and 2000pps for 100Mbps speed.								

### 3.5 CpuCar and port enable configuration

CpuCar mainly use to set port about the number of packets per unit time on the CUP, Enable means global open, selected port means enable CpuCar, rate by default 200pps, range 150-300, Disable means global shutdown.

Enable port is switch, non-selected port will shutdown.





**CpuCar Configuration**

Enable CPU Car Settings

200 150~300 pps (The default is 200pps)

1 <input checked="" type="checkbox"/>	2 <input checked="" type="checkbox"/>	3 <input checked="" type="checkbox"/>	4 <input checked="" type="checkbox"/>	5 <input checked="" type="checkbox"/>	6 <input checked="" type="checkbox"/>	7 <input checked="" type="checkbox"/>	8 <input checked="" type="checkbox"/>
9 <input checked="" type="checkbox"/>	10 <input checked="" type="checkbox"/>	11 <input checked="" type="checkbox"/>	12 <input checked="" type="checkbox"/>	13 <input checked="" type="checkbox"/>	14 <input checked="" type="checkbox"/>	15 <input checked="" type="checkbox"/>	16 <input type="checkbox"/>

Update

**Port Enabled Configuration**

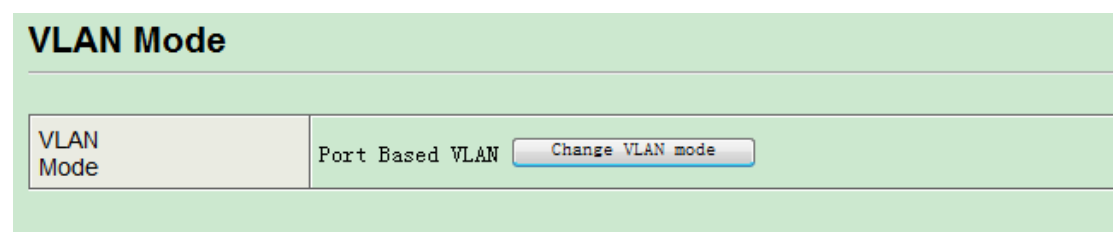
1 <input checked="" type="checkbox"/>	2 <input checked="" type="checkbox"/>	3 <input checked="" type="checkbox"/>	4 <input checked="" type="checkbox"/>	5 <input checked="" type="checkbox"/>	6 <input checked="" type="checkbox"/>	7 <input checked="" type="checkbox"/>	8 <input checked="" type="checkbox"/>
9 <input checked="" type="checkbox"/>	10 <input checked="" type="checkbox"/>	11 <input checked="" type="checkbox"/>	12 <input checked="" type="checkbox"/>	13 <input checked="" type="checkbox"/>	14 <input checked="" type="checkbox"/>	15 <input checked="" type="checkbox"/>	16 <input checked="" type="checkbox"/>

Update

## Chapter 4 VLAN Configuration

### 4.1 VLAN Mode

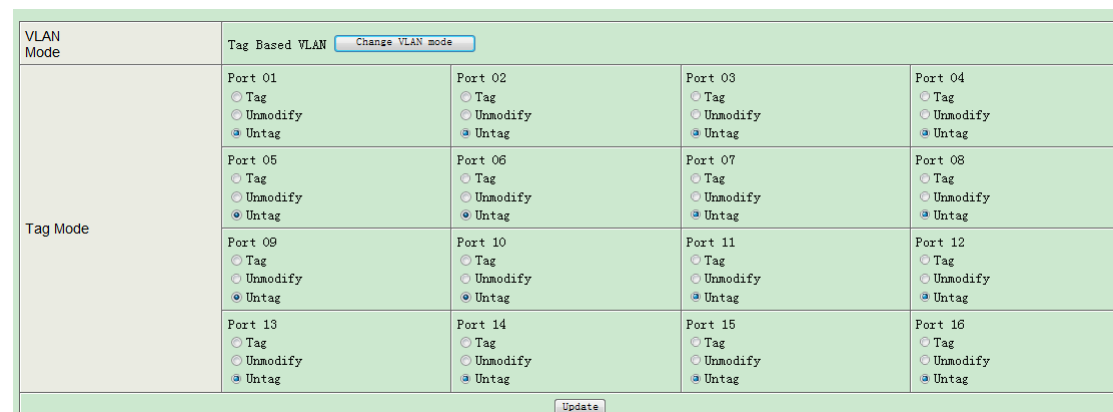
VLAN modes divide into Port Based VLAN and Tag Base VLAN. By default is Port Based VLAN mode. As below figure:



**VLAN Mode**

VLAN Mode	Port Based VLAN	<a href="#">Change VLAN mode</a>
-----------	-----------------	----------------------------------

Click (Change VLAN mode) to shift VLAN mode. On Tag Base VLAN mode page, user can configure Tag attribution, including Tag, Unmodify and Untag as following:



VLAN Mode	Tag Based VLAN <a href="#">Change VLAN mode</a>			
Tag Mode	Port 01 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag	Port 02 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag	Port 03 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag	Port 04 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag
	Port 05 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag	Port 06 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag	Port 07 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag	Port 08 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag
	Port 09 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag	Port 10 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag	Port 11 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag	Port 12 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag
	Port 13 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag	Port 14 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag	Port 15 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag	Port 16 <input type="radio"/> Tag <input type="radio"/> Unmodify <input checked="" type="radio"/> Untag
<a href="#">Update</a>				



Note: If the link partner is a network interface card, it probably cannot recognize the VLAN tag. In this case, it is strongly recommended the network administrator to remove the VLAN tag of the corresponding port.

### 4.2 VLAN Member

It can be divided according to VLAN mode:

1. Port Based VLAN member configuration

### VLAN Member Setting (Port Based)

Port	01 ▼ Read							
Dest PORT	01	02	03	04	05	06	07	08
select	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Dest PORT	09	10	11	12	13	14	15	16
select	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Update LoadDefault

(Port) is uplink port configuration and (Dest PORT) is downlink port configuration. (LoadDefault) is default configuration. For example: configure e0/1 to be uplink port and e0/1~16 to be downlink port to make e0/1 transmit packet to e0/2~16 as following:

VLAN MEMBER																
Port	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
2	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
3	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
4	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
5	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
6	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
7	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
8	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
9	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
10	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
11	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
12	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
13	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
14	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
15	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
16	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Port	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Click (LoadDefault) to restore to default value, that is, all (Port) contains all (Dest PORT) .



Note: Configured downlink port must contain uplink port, such as (Dest PORT) must contain e0/1.

## 2. Tag Base VLAN member configuration

VLAN Member Setting (Tag Based)																
VID:	14094 Add										Delete Update					
Add: Enter a VID, select the VLAN member for this entry and then press this button to add a VLAN entry to the table. Del: Select a VID in the table and then press this button to remove a VID entry from the table. Update: Modify the existing VID entry, select VID and then press the button.																
VLAN Member Port	01	02	03	04	05	06	07	08								
select	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								
VLAN Member Port	09	10	11	12	13	14	15	16								
select	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								
Note: If you do not select any port, this VID will be treated as a VID embedded in a 802.1Q tag.																
VID Source port	01	02	03	04	05	06	07	08								
select	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>								
VID Source port	09	10	11	12	13	14	15	16								
select	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>								
Port VID Map.																
Port	01	02	03	04	05	06	07	08								
VID	1	1	1	1	1	1	1	1								
Port	09	10	11	12	13	14	15	16								
VID	1	1	1	1	1	1	1	1								
VLAN MEMBER																
VID/Port	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
1	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v

Divide 16 groups of VLAN (1-16) in Tag Base VLAN mode, which cannot delete and



create. We suggest user click (Read) to load corresponded VID of configured VLAN and enter VID (1-4094). Select VLAN member in (Dest PORT) and enter pvid corresponded VLAN Index No. in (PVID Index) and click (Update) .

Port VID Map.								
Port	01	02	03	04	05	06	07	08
VID	1	1	1	1	1	1	1	1
Port	09	10	11	12	13	14	15	16
VID	1	1	1	1	1	1	1	1

VLAN MEMBER																
VID\Port	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
1	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v

When deleting VLAN, click (Delete) of the delete VLAN VID in the drop down menu.

When modifying VLAN, modify the VLAN ID in the drop down menu in front of (Delete) ,

When VLAN Member Port ticks or non-ticks VLAN member port, VID Source port ticks or non-ticks VLAN selected port, click(Update) .

## 4.3 VLAN Fast Configuration

Port isolation settings are based on Port Based. (Choice port number) is for uplink port.

**Multi to 1 Setting**

Destination PortNo	Port : 01 ▼
Current Setting	Port:-
<input type="button" value="Update"/>	
Note: Multi to 1 Set only in the Port Based VLAN mode effective.	

For example, uplink port chooses 01, port disable as 02, click (update) configure. Port 1 doesn't transmit packets to port 2 after configuring, but can transmit to all downlink ports. VLAN member as below:

VLAN MEMBER																
Port	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16(Fx)
1	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
2	v	v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	v	-	v	-	-	-	-	-	-	-	-	-	-	-	-	-
4	v	-	-	v	-	-	-	-	-	-	-	-	-	-	-	-
5	v	-	-	-	v	-	-	-	-	-	-	-	-	-	-	-
6	v	-	-	-	-	v	-	-	-	-	-	-	-	-	-	-
7	v	-	-	-	-	-	v	-	-	-	-	-	-	-	-	-
8	v	-	-	-	-	-	-	v	-	-	-	-	-	-	-	-
9	v	-	-	-	-	-	-	-	v	-	-	-	-	-	-	-
10	v	-	-	-	-	-	-	-	-	v	-	-	-	-	-	-
11	v	-	-	-	-	-	-	-	-	-	v	-	-	-	-	-



## Chapter 5 Packet Accounting

### 5.1 Packet Accounting

Packet accounting includes four types: Receive Packet & Transmit Packet, Transmit Packet & Collision Count, Receive Packet & Drop packet, and Receive Packet & CRC error packet, after choosing types, click (update) set account type. Click (refresh) refreshed value. Click (set to Zero) to zero.

Counter Category		
Counter Mode Selection: Massive Packet & Transmit Packet ▼ <a href="#">Update</a>		
Port	Receive Packet	Transmit Packet
01	1949	2459
02	0	0
03	0	0
04	0	0
05	0	0
06	0	0
07	0	0
08	0	0
09	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
<a href="#">Refresh</a> <a href="#">Clear</a>		



Note: System doesn't refresh automotive, click (refresh) by manual.



## Chapter 6 QoS Configuration

### 6.1 Priority Mode

Priority mode includes:

#### 1. FIFO (First-in first-out)

When queue scheduling, switch will handle packet with time order (the default mode) .

#### 2. PQ (Strict-Priority Queue)

When queue scheduling, PQ precendently transmits the packets in superior priority according to the priority level. Transmit packet in inferior priority when the superior one is empty. Put the key service in the superior one, and non-key service (such as email) in inferior one to guarantee the packets in superior group can be first transmitted and non-key service can be transmitted in the spare time.

#### 3. WRR (Weighted Round Robin)

WRR queue scheduler divides a port into 4 outputting queues that is Q1, Q2, Q3, Q4 and each scheduler is in turn to guarantee the service time for each queue. WRR can configure a weighted value (that is, Q1, Q2, Q3, Q4 in turn) which means the percentage of obtaining the resources. For example: There is a port of 100M. Configure its WRR queue scheduler value to be 50, 30, 10, 10 (corresponding Q1, Q2, Q3, Q4 in turn) to guarantee the inferior priority queue to gain at least 10Mbit/s bandwidth, to avoid the shortage of PQ queue scheduler in which packets may not gain the service.

#### Priority Mode

Mode	<input checked="" type="radio"/> First-In-First-Out
	<input type="radio"/> All-High-before-Low(Strict Priority): All packets will be assigned to either Q2(high) priority queue or Q1(low) priority queue.
	<input type="radio"/> 4 Queue WRR => Q1: <input type="text" value="8"/> Q2: <input type="text" value="8"/> Q3: <input type="text" value="8"/> Q4: <input type="text" value="8"/>
<input type="button" value="Update"/>	



Note: When the queue weight is set to "0", it will be treated as "8".

## 6.2 Priority Configuration Based on TCP/UDP and IP TOS/DS

### 1. QOS based on TCP/UDP

Configure FTP here, the famous port number SSH etc, UserDEF\_a, UserDEF\_b, UserDEF\_c are self-defined port number, range as 1-65535, not overlap. Inspect TCP/UDP priority with the ticked ports; no configure about QSW at TCP/UDP protocol ports.

TCP/UDP port	
Protocol/TD>	Note: (1) Q1 ~ Q4 options are effective for the selected physical port only. (2) "Drop" option is the global setting for all physical ports.
FTP(20,21)	Q1 ▼
SSH(22)	Q1 ▼
TELNET(23)	Q1 ▼
SMTP(25)	Q1 ▼
DNS(53)	Q1 ▼
TFTP(69)	Q1 ▼
HTTP(80,8080)	Q1 ▼
POP3(110)	Q1 ▼
NEWS(119)	Q1 ▼
SNTP(123)	Q1 ▼
NetBIOS(137~139)	Q1 ▼
IMAP(143,220)	Q1 ▼
SNMP(161,162)	Q1 ▼
HTTPS(443)	Q1 ▼
MSN(1863)	Q1 ▼
XRD_RDP(3389)	Q1 ▼
QQ(4000,8000)	Q1 ▼
ICQ(5190)	Q1 ▼
Yahoo(5050)	Q1 ▼
BOOTP/DHCP(67,68)	Q1 ▼
UserDEF_a	Q1 ▼
UserDEF_b	Q1 ▼
UserDEF_c	Q1 ▼



Note: it is effective for selected ports in Q1~Q4, drop is for all ports, no valid with famous numbers in self-defined ports.

### 2. IP/DS priority

(TOS priority) includes seven types of IP/DS: 6'b001010, 6'b010010, 6'b011010, 6'b100010, 6'b101110, 6'b110000 and 6'b111000, tick off selected ports, click (update) .



IP TOS/DS								
IP TOS/DS Priority Setting	6'b001010: <input type="text"/> 6'b010010: <input type="text"/> 6'b011010: <input type="text"/> 6'b100010: <input type="text"/> 6'b101110: <input type="text"/> 6'b110000: <input type="text"/> 6'b111000: <input type="text"/> Other Values: Q1							
IP TOS/DS Port Setting	01	02	03	04	05	06	07	08
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	09	10	11	12	13	14	15	16
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="button" value="Update"/>								

Note: The switch treats TCP/UDP, IP TOS/DS, 802.1p and physical port CoS scheme in the following priority.  
 TCP/UDP > IP TOS/DS > 802.1p > Physical port.  
 This means TCP/UDP CoS will override all other settings.

## 6.3 802.1p and Physical Port Priority

### 1. 802.1p priority configuration

As below figure, tick off relevant ports, click (update).

802.1p and Physical port CoS Configuration								
802.1p								
Port No.	01	02	03	04	05	06	07	08
Mode:802.1p	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Port No.	09	10	11	12	13	14	15	16
Mode:802.1p	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For 802.1p priority field, the switch utilizes the following priority mapping table. 6 and 7 are mapped to the "Q4" priority queue. 4 and 5 are mapped to the "Q3" priority queue. 0 and 3 are mapped to the "Q2" priority queue. 1 and 2 are mapped to the "Q1" priority queue.								
<input type="button" value="Update"/>								

### 2. Physical port priority configuration

As below figure, each port chooses Q1~Q4, click (update) .

Physical port							
Port 01	Port 02	Port 03	Port 04	Port 05	Port 06	Port 07	Port 08
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Port 09	Port 10	Port 11	Port 12	Port 13	Port 14	Port 15	Port 16
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="button" value="Update"/>							

Note: The switch treats TCP/UDP, IP TOS/DS, 802.1p and physical port CoS scheme in the following priority.  
 TCP/UDP > IP TOS/DS > 802.1p > Physical port.  
 This means TCP/UDP CoS will override all other settings.

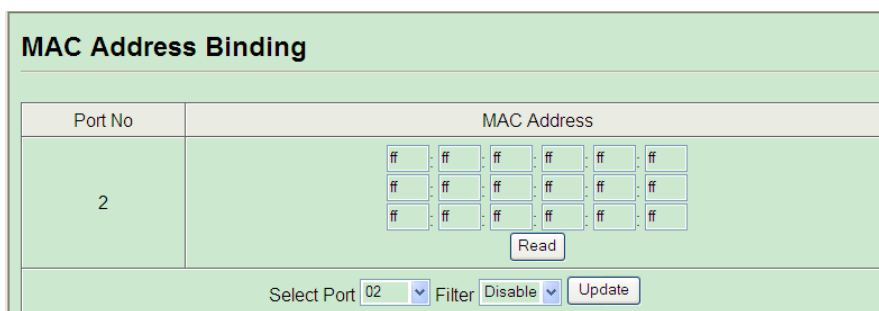


Note: four types of priority: TCP/UDP, IP TOS/DS, 802.1p and Physical port  
 TCP/UDP>IP TOS/DS>802.1p>Physical port, TCP/UDP priority is higher than other 3 types.

## Chapter 7 Packet Security Filtering

### 7.1 MAC Address Binding

As below figure, (Binding) makes enable, or invalid, (Read) means reading port bounded MAC. Each port can bind 3 groups of MAC address. Packet whose MAC has not bound will not be transmitted.



**MAC Address Binding**

Port No	MAC Address
2	<div>ff ff ff ff ff ff</div> <div>ff ff ff ff ff ff</div> <div>ff ff ff ff ff ff</div>

Read

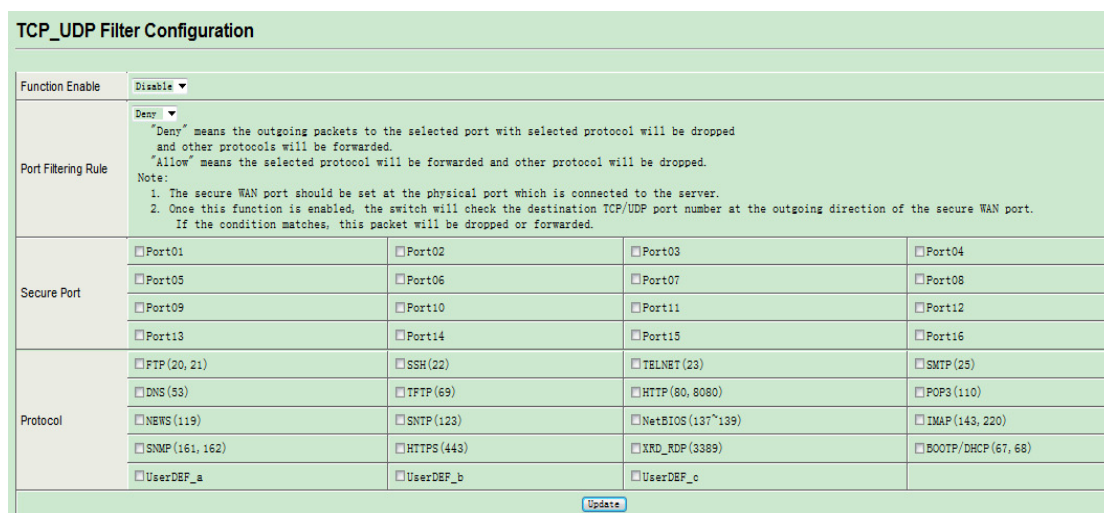
Select Port: 02 Filter: Disable Update

For example, configure (Select Port) e0/1, select enable in (Filter) and bind MAC address 00:0a:5a:01:01:01. After successful configuration, e0/1 will only transmit packet whose source address is 00:0a:5a:01:01:01.



Note: By default, (Filter) of each port is disabled.

### 7.2 TCP/UDP Filtration



**TCP\_UDP Filter Configuration**

Function Enable: Disable

Port Filtering Rule: Deny  
 "Deny" means the outgoing packets to the selected port with selected protocol will be dropped and other protocols will be forwarded.  
 "Allow" means the selected protocol will be forwarded and other protocol will be dropped.  
 Note:  
 1. The secure WAN port should be set at the physical port which is connected to the server.  
 2. Once this function is enabled, the switch will check the destination TCP/UDP port number at the outgoing direction of the secure WAN port. If the condition matches, this packet will be dropped or forwarded.

Secure Port:

<input type="checkbox"/> Port01	<input type="checkbox"/> Port02	<input type="checkbox"/> Port03	<input type="checkbox"/> Port04
<input type="checkbox"/> Port05	<input type="checkbox"/> Port06	<input type="checkbox"/> Port07	<input type="checkbox"/> Port08
<input type="checkbox"/> Port09	<input type="checkbox"/> Port10	<input type="checkbox"/> Port11	<input type="checkbox"/> Port12
<input type="checkbox"/> Port13	<input type="checkbox"/> Port14	<input type="checkbox"/> Port15	<input type="checkbox"/> Port16

Protocol:

<input type="checkbox"/> FTP (20, 21)	<input type="checkbox"/> SSH (22)	<input type="checkbox"/> TELNET (23)	<input type="checkbox"/> SMTP (25)
<input type="checkbox"/> DNS (53)	<input type="checkbox"/> TFTP (69)	<input type="checkbox"/> HTTP (80, 8080)	<input type="checkbox"/> POP3 (110)
<input type="checkbox"/> NEWS (119)	<input type="checkbox"/> SNMP (123)	<input type="checkbox"/> NetBIOS (137~139)	<input type="checkbox"/> IMAP (143, 220)
<input type="checkbox"/> SNMP (161, 162)	<input type="checkbox"/> HTTPS (443)	<input type="checkbox"/> XRDP (3389)	<input type="checkbox"/> BOOTP/DHCP (67, 68)
<input type="checkbox"/> UserDEF_a	<input type="checkbox"/> UserDEF_b	<input type="checkbox"/> UserDEF_c	

Update

When (Function Enable) is enable, it means this function is efficient.



Deny in(Port Filtering Rule) means port packet of selected protocol is dropped and packet of other protocol can be transmitted. Allow means port packet of selected protocol is transmitted and packet of other protocol can be dropped.

(Secure Port) means configuring WAN interface of TCP/UDP filtration.

(Protocol) includes 20 different network protocols. In addition, UserDEF\_a, UserDEF\_b and UserDEF\_c are user defined port protocol (these three protocols need configuring on QoS page of TCP/UDP).

Such as to enable this function, configure port filtration to deny, select secure WAN port01, and then select Protocol FTP. After successful configuration, port01 will drop FTP packet.



## Chapter 8 Spanning Tree

### 8.1 STP Bridge

As below configurations:

STP mode: disable, rstp

Bridge Priority:0-61440

Hello Time: 1-10seconds

Max Age: 6-40seconds

Forward Delay: 4-30seconds

**STP Bridge Settings**

Spanning Tree Settings				
STP Mode	Bridge Priority (0~61440)	Hello Time (1~10 Sec)	Max Age (6~40 Sec)	Forward Delay (4~30 Sec)
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="button" value="Submit"/>				
<i>Note: <math>2 * (\text{Forward Delay} - 1) \geq \text{Max Age}</math>, <math>\text{Max Age} \geq 2 * (\text{Hello Time} + 1)</math></i>				

Note: If you enable the MAC address binding function, the address learning function will be disabled au

Bridge Status				
STP Mode	Bridge ID	Hello Time	Max Age	Forward Delay
RSTP	61440:00 1F CE 00 00 01	2	20	15

Root Status			
Root ID	Hello Time	Max Age	Forward Delay
I'm the root bridge!	2	20	15

### 8.2STP Port

#### 1. Port configuration

Set port priority, port path cost

## 2. Port status

It mainly shows that port path cost, priority, forwarding state, STP port status etc.

### STP Port Settings

STP Port Settings

Port No.	Priority (0~240)	Port Path Cost (1~200000000) 0=AUTO
▼		
<input type="button" value="Submit"/>		

STP Port Status						
Port No.	Port Path Cost	Priority	State	Status	Designated Bridge	Designated Port
1	Auto:200000	128	Designated Port	Forwarding	--	--
2	Auto:0	128	--	Down	--	--
3	Auto:0	128	--	Down	--	--
4	Auto:0	128	--	Down	--	--
5	Auto:0	128	--	Down	--	--
6	Auto:0	128	--	Down	--	--
7	Auto:0	128	--	Down	--	--
8	Auto:0	128	--	Down	--	--
9	Auto:0	128	--	Down	--	--
10	Auto:0	128	--	Down	--	--

## 8.3 Loop Detection

### 1. Enable loop detection

Enable means start loop detection; Disable means end loop detection

### 2. Enable auto wake-up

Enable means start auto wake-up; Disable means end auto wake-up.

### 3. Enable wake-up internal

Enabling wake-up internal means Discard duration at loopback port.

## Loopback Detection Settings

Loopback Detect Function	Enable ▼
Auto Wake Up	Enable ▼
Wake-Up Time Interval	30 sec ▼
<input type="button" value="Submit"/>	

Port No.	Status
1	--
2	--
3	--
4	--
5	--
6	--
7	--
8	--
9	--
10	--



## Chapter 9 Truck

### 9.1 Truck Configuration

Truck hash algorithm selection divides into port ID, source MAC address, destination MAC address, Src&Dst MAC. Click (update)

Trunk Configuration				
Trunk Hash Algorithm Selection		<input checked="" type="radio"/> Port ID <input type="radio"/> SA <input type="radio"/> DA <input type="radio"/> SA & DA		
Trunk0	Port1	Port2	Port3	Port4
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trunk1	Port5	Port6	Port7	Port8
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="button" value="Update"/>				
<small>1. Selecting one port for a trunk will treated as a void setting. 2. Don't connect both trunks channels to a single switch, this will cause unlimited traffic loop once a broadcast packet is coming to any port of the switch.</small>				

There are two aggregation groups, group1 includes port 1-4, group1 includes 2 includes 5-8.



## Chapter 10 DHCP Relay Agent

### 10.1 DHCP Relay Agent

(DHCP Relay status) Enable means start this function, Disable means shutdown. The range of hops is 1-16, (DHCP Relay Option 82 option configuration) Enable means start this function, Disable means shutdown.

DHCP Relay Agent	
DHCP Relay State :	Disable ▾
DHCP Relay Hops Count Limit (1-16):	16
DHCP Relay Option 82 State :	Disable ▾
<input type="button" value="Update"/>	

### 10.2 Relay Server

Add almost 3 Relay Server when starting. Input Server IP such as 192.168.2.10, click (add) , when deleting, click(DEL).

DHCP Relay Agent	
DHCP Server IP	<input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/> <input type="button" value="Add"/>
DHCP Server IP List	

### 10.3 VLAN MAP Relay Agent

Add Relay Server IP mapping of VLAN ID, input VLAN ID as example 1, choose Server IP192.168.2.10 click (add).





**DHCP Relay Agent**

VLAN ID	1-4094	Map Server IP	<div></div>	<div>Add</div>
---------	--------	---------------	-------------	----------------

**MAP List**

VLAN ID	Server IP	Action
---------	-----------	--------



## Chapter 11 Backup and Recovery Configuration

### 11.1 Configure Backup and Recovery

#### 1. Configure backup

Click (Download) to get download box. Select path to save Bin file to local disk.

#### 2. Configure recovery

Click (Browse) to get file selection box. Select corresponded path to open configuration file.

Enter password. The default password is **admin** and click (Update) . Reboot device after successful configuration.

**Configuration Backup/Recovery**

**Backup**  
Please check "Download" to download EEPROM default .

**Recovery**  
Select the image file :    
Password:



Note: The recovery will not contain MAC address.



## Chapter 12 Other Function

### 12.1 Other functions

Other functions include:

1. Output queue aging time:

Set output queue aging time as 200ms, 400ms, 600ms, 800ms, Disable means shutdown.

2. VLAN transparent transmit:

After enabling this function, though the two ports are not in the same VLAN, the unicast packet whose destination MAC is known will be transmitted to destination port.

3. Enable IGMP snooping VLAN:

Miscellaneous Setting	
Output Queue Aging Time	
Aging time Disable ▼ ms	The output queue aging function allows the administrator to select the aging time of a packet stored in the output queue. A packet stored in the output queue for a long time will lower the free packet buffer, resulting in the poor utilization of the buffer and the poor switch performance.
VLAN Striding	
VLAN Striding Disable ▼	When this function is enabled, the switch will forward a uni-cast packet to the destination port. No matter whether the destination port is in the same VLAN group.
IGMP Snooping V1 & V2	
IGMP Snooping Disable ▼	IGMP Snooping V1 & V2 function enable
<a href="#">Update</a>	



## Chapter 13 Overtime Exit and Re-log in

### 13.1 Overtime Exit

It is defaulted to be overtime in 10 minutes and it is required to re-login as following:



Click (Re login) to re-log in.

### 13.2 Re-log in

Click host page (Re login) to re-log in.



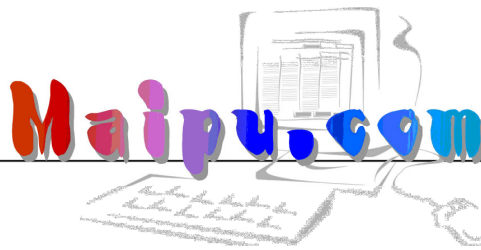
## Chapter 14 Restore to Default Hardware Configuration

### 14.1 Restore to Default Hardware Configuration

Before using the switch for the first time, it is suggested to restore to default hardware configuration. Press “Default” button until 5 seconds after the electric power is on. The switch will restore to the default hardware configuration automatically and the system indicator will flicker. Re-login the switch until the system indicator restore to normal flicker frequency (normal flicker frequency is 1Hz).



Caution: Restoring to default hardware can restore default software parameter and also IP address, username and password, except MAC address



## Appendix

Appendix 1 Diagnosis of the common faults

Faults	Possible cause	Solutions
All indicators are not on when the electric power is on	Power connection error or abnormal power supply	Check power wire and electrical outlet
Link/Active indicator is off	Cable damaged; use wrong type of cable; cable is beyond permitted length; poor contacted cable; the other end of the connection work abnormally	Change cable; reconnect cable; check the working of the other end
Link/Active indicator is on but the network is unreachable	Working mode of switch and Ethernet terminal does not matched; network configuration error	Change working mode of Ethernet interface to match each other of to be auto-negotiation; check network configuration, including configuration of switch and the other end
All Link/Active indicators are on but network deamplificational speed or unreachable	Broadcast storm	Check if there is the ring and reasonably allocate the network; check if there is plenty broadcast packets
Stop working after normally working for a certain time	Power error; overheat; program works abnormal	Check the power connection and the voltage; check the environment and air ventilator is unblocked; reboot the switch after the electric power is on

## Appendix 2 Terms

Terms	Description
Backbone	Part of a network that acts as the primary path for traffic that is most often sourced from, and destined for, other networks.
Bandwidth	The difference between the highest and lowest frequencies available for network signals. The term also is used to describe the rated throughput capacity of a given network medium or protocol. The frequency range necessary to

	convey a signal measured in units of hertz (Hz).
broadcast storm	An undesirable network event in which many broadcasts are sent simultaneously across all network segments. A broadcast storm uses substantial network bandwidth and, typically, causes network time-outs.
10BASE-T	10BaseT, which is part of the IEEE 802.3 specification, has a distance limit of approximately 328 feet (100 meters) per segment. See also Ether Channel and IEEE802.3.
100BASE-TX	100-Mbps baseband Fast Ethernet specification using two pairs of either UTP or STP wiring. The first pair of wires receives data; the second transmits data. To guarantee the proper signal timing, a 100BaseTX segment cannot exceed 328 feet (100 meters) in length. Based on the IEEE 802.3 standard.
100BASE-FX	A 100-Mbps baseband Fast Ethernet specification using two strands of multimode fiber-optic cable per link. To guarantee proper signal timing, a 100BaseFX link cannot exceed 1312 feet (400 meters) in length. Based on the IEEE 802.3 standard.
Auto-negotiation	Auto-negotiation (formerly NWay) is an Ethernet procedure by which two connected devices choose common transmission parameters, such as speed and duplex mode. In this process, the connected devices first share their capabilities as for these parameters and then choose the fastest transmission mode they both support.
QoS	Quality of Service
HOL	Head-Of-Line. HOL arises when packets arriving at different input ports are destined for the same output port.
full duplex	Capability for simultaneous data transmission between a sending station and a receiving station.
half duplex	Capability for data transmission in only one direction at a time between a sending station and a receiving station. BSC is an example of a half-duplex protocol.
MDI	A medium dependent interface (MDI) port or an uplink port is an Ethernet port connection typically used on the Network Interface Card (NIC) or Integrated NIC port on a PC.
MDIX	Medium dependent interface crossover (MDIX) (the "X" representing "crossover") is a female RJ-45 port connection on a computer, router, hub, or switch. Straight through cables connect pins 1 & 2 (transmit) on an MDI device to pins 1 & 2



	(receive) on an MDIX device.
RJ-45	The 8 Position 8 Contact (8P8C) (often called RJ45 see below) modular plugs and sockets are communications connectors.
Bridge	Device that connects and passes packets between two network segments that use the same communications protocol. Bridges operate at the data link layer (Layer 2) of the OSI reference model. In general, a bridge filters, forwards, or floods an incoming frame based on the MAC address of that frame.
SNMP	Simple Network Management Protocol

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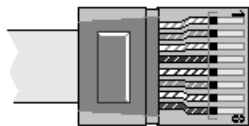




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MDIX	Medium dependent interface crossover (MDIX) (the “X” representing “crossover”) is a female RJ-45 port connection on a computer, router, hub, or switch. Straight through cables connect pins 1 & 2 (transmit) on an MDI device to pins 1 & 2 (receive) on an MDIX device.
RJ-45	The 8 Position 8 Contact (8P8C) (often called RJ45 see below) modular plugs and sockets are communications connectors.
Bridge	Device that connects and passes packets between two network segments that use the same communications protocol. Bridges operate at the data link layer (Layer 2) of the OSI reference model. In general, a bridge filters, forwards, or floods an incoming frame based on the MAC address of that frame.
SNMP	Simple Network Management Protocol

## Appendix 3 Cable

### RJ-45 Connector



Appendix figure 1 RJ-45 connector

Appendix figure 1 is RJ-45 connector (well pressure of RJ-45 twisted pair) , from up to down, pin numbers are 1-8.

Table 1 describes the function of each pin of RJ-45 in MDI mode;

Table 2 describes the function of each pin of RJ-45 in MDIX mode

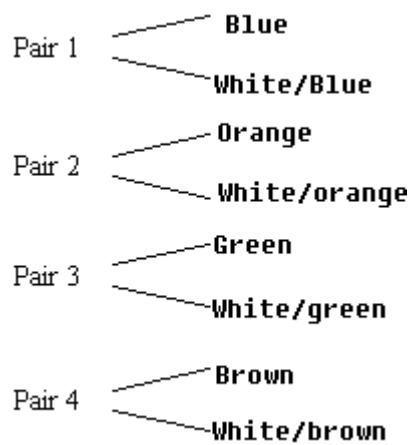
Appendix table 1 Pin distribution of RJ-45 MDI interface

Pin number	Signal	Function
1	TxData+	Sending data
2	TxData-	Sending data
3	RxData+	Receiving data
4	Reserved	
5	Reserved	
6	RxData-	Receiving data
7	Reserved	
8	Reserved	

Appendix table 2 Pin distribution of RJ-45 MDIX interface

Pin number	Signal	Function
1	RxData+	Receiving data
2	RxData-	Receiving data
3	TxData+	Sending data
4	Reserved	
5	Reserved	
6	TxData-	Sending data
7	Reserved	
8	Reserved	

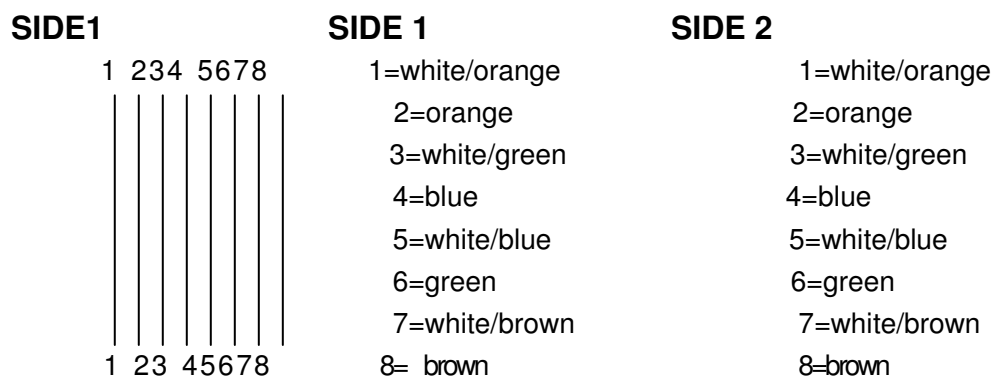
Make Cable



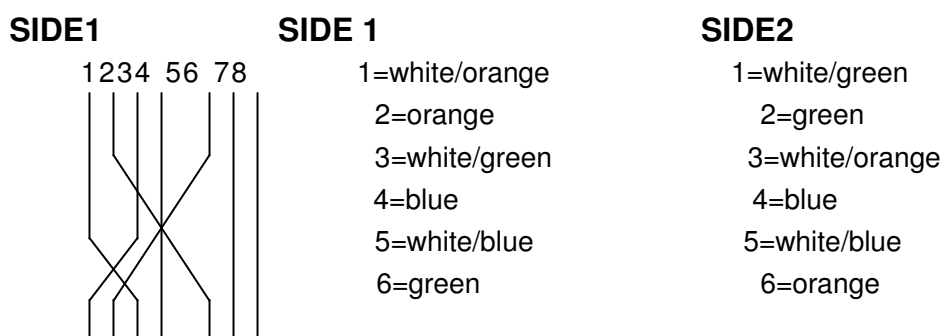
Appendix picture 2 The picture of categories 5 twisted-pair

Categories 5 twisted-pair consists of 8-core filament with the color on the insulated layer being grouping sign. Usually, it uses a single color and single color with white to be a pair of standard, and sometimes uses color points to be a pair of sign. Here, take the former as an example.

Categories 5 twisted-pair consists of 8-core filament with the color on the insulated layer being grouping sign. Usually, it uses a single color and single color with white to be a pair of standard, and sometimes uses color points to be a pair of sign. Here, take the former as an example.



Appendix picture 3 Making parallel reticle





1234 5678      7=white/brown      7=white/brown  
8=brown      8=brown

Appendix picture 4 Making crossing reticle